Claims

1. Integrated optical chip having a crystalline structure cut along parallel principal crystallographic planes and a thickness of less than 1.0mm, an optical signal pathway being disposed generally longitudinally in one of the cut surfaces of the chip, wherein the chip is attached to a substrate material having similar coefficients of thermal expansion in the said principal crystallographic plane, characterised by a grounding plane disposed between the chip and substrate providing an electrically conductive path between opposite lateral surfaces of the chip, and the thickness of the substrate material being up to 1.0mm.
2. Integrated optical chip according to claim 1, wherein the lateral surfaces of the chip have an electrically conductive coating.
3. Integrated optical chip according to claim 1, wherein the chip comprises lithium niobate.
4. Integrated optical chip according to claim 3, wherein the substrate material comprises a ceramic/thermoset polymer composite.
5. Integrated optical chip according to claim 1, wherein the substrate material comprises the same material as that of the chip.
6. Integrated optical chip according to claim 1, wherein the chip is attached to the substrate with adhesive.
7. Integrated optical chip according to claim 6, wherein the adhesive comprises epoxy resin.
8. Integrated optical chip according to claim 1, wherein the electrically conductive path comprises a metallised layer.
9. Integrated optical chip according to claim 1, wherein the thickness of the chip is less than 0.5mm.
10. Integrated optical chip according to claim 1, wherein the thickness of the chip is less than 0.25mm.
11. Method of manufacturing an integrated optical chip, the chip having a crystalline structure cut along parallel principal crystallographic planes and a thickness of less than 1.0 mm, an optical signal pathway being disposed in one of the cut surfaces of the chip, the method comprising the steps of:
    (i) forming at least one optical signal pathway in a first surface of a crystalline wafer cut along parallel principal crystallographic planes to a thickness less than 1 mm;

(ii) applying an electrically conductive layer to a second surface of the crystalline wafer opposite to that of the optical signal pathway;

(iii) attaching a substrate material slab to the said conductive layer on the said crystalline wafer, said slab having a thickness up to 1.0mm and similar coefficients of thermal expansion to the said wafer in the said principal crystallographic plane;

(iv) dicing a composite chip on substrate from the wafer-slab structure, the said composite chip comprising a substrate and at least one optical signal pathway extending generally longitudinally with respect to the composite chip; and

(v) applying an electrically conductive path to lateral surfaces of the said composite chip.

12. Method of mounting an integrated optical chip on a substrate according to claim 11, wherein the surface of the composite chip on which the optical signal pathway is formed and the longitudinal end surfaces between which the optical signal pathway extends are masked prior to applying an electrically conductive path.

13. Method of mounting an integrated optical chip on a substrate according to claim 11, wherein the crystalline wafer comprises lithium niobate.

14. Method of mounting an integrated optical chip on a substrate according to claim 13, wherein the substrate material comprises a ceramic/thermoset polymer composite.

15. Method of mounting an integrated optical chip on a substrate according to claim 11, wherein the substrate material comprises the same material as that of the chip.

16. Method of mounting an integrated optical chip on a substrate according to claim 11, wherein the chip is bonded on the substrate with adhesive.

17. Method of mounting an integrated optical chip on a substrate according to claim 16, wherein the electrically conductive layer comprises a metallised grounding plane and the adhesive comprises epoxy resin.

18. Method of mounting an integrated optical chip on a substrate according to claim 17, wherein the metallised grounding plane is deposited by an electron beam evaporation process.

19. Method of mounting an integrated optical chip on a substrate according to claim 16, wherein the adhesive is electrically conductive.

20. Method of mounting an integrated optical chip on a substrate according to claim 11, wherein the electrically conductive path comprises a metallised layer.

21. Method of mounting an integrated optical chip on a substrate according to claim 20, wherein the metallised layer comprises a composite layer of two metals selected from the group consisting of titanium, gold, aluminium, nickel, chromium and tungsten.
22. Method of mounting an integrated optical chip on a substrate according to claim 20, wherein the metallised layer is deposited by an electron beam evaporation process.